

REMARKS

The claims have been amended to more clearly define the invention as disclosed in the written description. In particular, claim 14 has been cancelled, while the claims have been amended for clarity.

The Examiner has rejected claims 1, 7-9 and 12-15 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,230,047 to McHugh. The Examiner has further rejected claims 2-4 under 35 U.S.C. 103(a) as being unpatentable over McHugh in view of U.S. Patent 5,742,689 to Tucker et al. In addition, the Examiner has rejected claims 2-4 (claim 5?) under 35 U.S.C. 103(a) as being unpatentable over McHugh in view of U.S. Patent 6,817,440 to Kim. Furthermore, the Examiner has rejected claim 11 under 35 U.S.C. 103(a) as being unpatentable over McHugh in view of U.S. Patent 6,520,905 to Surve et al. Moreover, the Examiner has rejected claims 6 and 10 under 35 U.S.C. 103(a) as being unpatentable over McHugh.

The McHugh patent discloses musical listening apparatus with pulse-triggered rhythm, in which a monitor detects the pulse rate of a user, and an audio signal from a music device is processed such that the rhythm of the music in the audio signal matches the pulse rate of the user.

As noted in MPEP §2131, it is well-founded that "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of*

California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Further, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The invention as claimed in, for example, claim 1, includes the limitation "the conditioning unit comprises audio processing means for processing the input audio signal to derive the output audio signal with a reproduction quality in dependence on the mathematical cost, whereby a user is able to discern, by the reproduction quality, a deviation of the mathematical cost from a predetermined optimal mathematical cost". The Examiner has indicated that this limitation is found in McHugh, referencing col. 2, lines 57-67 and col. 5, lines 35-47.

These portions of McHugh state:

"In another aspect, the present invention provides an apparatus which receives a signal from the heartbeat of an individual user and triggers a programmed rhythm that is played at the tempo of the user's heartbeat. As the user's pulse rate increases, the tempo of the rhythm correspondingly increases; as the user's pulse rate decreases, a corresponding decrease also occurs. The apparatus advantageously correlates the musical rhythm that is heard with the rate of the individual's heartbeat and allows a user to exercise to his/her own internal clock."

and

"The amplified analog signal 48 is received by an output device 50. The output device 50 may be audio speakers, such as conventional stereo headphones of the type utilized with portable music playing devices. The amplified analog signal 48, in this embodiment, is a triggered, programmed rhythm that is played at the

tempo of the user's heart rate. As the user's pulse rate increases, the tempo of the rhythm correspondingly increases; as the user's pulse rate decreases, the tempo of the rhythm correspondingly decreases. The system advantageously correlates the heartbeat pace of the user with the musical rhythm that is heard and allows the user to exercise to the user's own internal clock."

Applicants submit that in the McHugh apparatus, the object is the match the rhythm of the audio signal being played to, for example, the pulse rate of the user, as the user's pulse rate increases, the rhythm of the audio signal being played increases, and as the user's pulse rate decreases, the rhythm of the audio signal being played decreases. However, since the correlates the heartbeat pace of the user with the musical rhythm, there is no way for the user to discern whether or not he/she is working out at the appropriate pace.

In the subject invention, on the other hand, "the conditioning unit comprises audio processing means for processing the input audio signal to derive the output audio signal with a reproduction quality in dependence on the mathematical cost, whereby a user is able to discern, by the reproduction quality, a deviation of the mathematical cost from a predetermined optimal mathematical cost". As described in the specification on page 2, line 31 to page 3, line 4, the reproduction quality may by the volume level of the reproduced sound such that the further the user under-performs, the lower the volume level of the reproduced sound. Conversely, as the user approaches the optimum performance level, the volume level of the reproduced sound approaches a predetermined

optimum level. As such, the user is able to discern, by the reproduction quality, a deviation of the mathematical cost (actual performance level) from a predetermined optimal mathematical cost (a predefined optimum performance level).

Applicants submit that this is neither shown nor suggested by McHugh.

Claim 2 includes the limitation "the reproduction quality comprises a three-dimensional position of a virtual sound source, the audio processing means being able to simulate the virtual sound source using the output audio signal, whereby as the reproduction quality changes from an optimal quality, the three-dimensional position of the virtual sound source changes from an optimal position".

The Tucker et al. patent discloses a method and device for processing a multichannel signal for use with a headphone, in which the well-known principles of head related transfer functions is used to give the impression of multiple phantom or virtual loudspeaker positions in order to simulate multi-channel audio while using headphones with only two loudspeakers. However, there is no disclosure or suggestion in Tucker et al. that the position of any of the virtual loudspeakers should be changes based on the mathematical cost.

Applicants submit that the combination of Tucker et al. and McHugh would result in an audio system in which the rhythm of the output audio signal correlates to the pulse rate of the user, and that the output audio signal is presented to the user via

headphones utilizing HRTF to yield a multi-channel virtual sound stage.

Further, Applicants submit that Tucker et al. does not supply that which is missing from McHugh, i.e., "the conditioning unit comprises audio processing means for processing the input audio signal to derive the output audio signal with a reproduction quality in dependence on the mathematical cost, whereby a user is able to discern, by the reproduction quality, a deviation of the mathematical cost from a predetermined optimal mathematical cost".

Claim 5 includes the limitation "the audio processing means derives a second output audio signal, together with the output audio signal constituting a stereo audio signal, the audio processing means deriving the stereo audio signal from the input audio signal with a specified stereo quality dependent on the mathematical cost."

The Kim patent discloses multichannel headphones having at least two enclosures for each earpiece, and each enclosure including at least one speaker unit, thereby having two speaker units for each earpiece. However, there is no disclosure or suggestion in Kim for generating the stereo quality dependent on the mathematical cost. In fact, Kim has nothing to do with processing an audio signal. The Kim headphones are only capable of reproducing sound from the two speaker units in each earpiece without the speaker units acoustically interfering with each other.

Applicants therefore submit that the combination of McHugh and Kim neither discloses nor suggests "the conditioning unit

comprises audio processing means for processing the input audio signal to derive the output audio signal with a reproduction quality in dependence on the mathematical cost, whereby a user is able to discern, by the reproduction quality, a deviation of the mathematical cost from a predetermined optimal mathematical cost", nor "the audio processing means deriving the stereo audio signal from the input audio signal with a specified stereo quality dependent on the mathematical cost."

Claim 11 includes the limitation "the mathematical cost calculation unit derives the mathematical cost from a biometric measurement".

The Surve et al. patent discloses management of physiological and psychological state of an individual using images portable biosensor device, in which a portable biometric device is used to measure and record a user's physiology throughout the day by measuring heart rate or skin conductance response, etc.

Applicants submit, however, that Surve et al. does not supply that which is missing from McHugh, i.e., "the conditioning unit comprises audio processing means for processing the input audio signal to derive the output audio signal with a reproduction quality in dependence on the mathematical cost, whereby a user is able to discern, by the reproduction quality, a deviation of the mathematical cost from a predetermined optimal mathematical cost."

In view of the above, Applicants believe that the subject invention, as claimed, is neither anticipated nor rendered obvious

by the prior art, either individually or collectively, and as such,
is patentable thereover.

Applicants believe that this application, containing
claims 1-13 and 15, is now in condition for allowance and such
action is respectfully requested.

Respectfully submitted,

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